

REMARKS

With the above amendments, claims 1-22 remain in the application and stand rejected. Reconsideration of the rejection is respectfully requested in light of the following reasons.

Amendment to the Specification

The specification has been amended to correct a typographical error noted in the last office action. Applicants thank the Examiner for his thorough review of the application.

Claim Rejection -- 35 U.S.C. § 102 (Ferguson)

Claims 1-3, 7, 10-12, 17, 18, 20, and 22 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,185,042 by Ferguson ("Ferguson"). The rejection is respectfully traversed.

To anticipate a claim, a reference must include all the limitations of the claim. As will be demonstrated below, Ferguson does not teach or suggest at least one limitation of each rejected claim.

Claim 1 is patentable over Ferguson at least for reciting: "the contact points on the first area being electrically coupled to corresponding contact points on an area on a backside of a second solar cell by **separate and discrete pieces of interconnect leads**" (emphasis added). It is respectfully submitted that Ferguson discloses an entirely different approach to interconnecting solar cells.

Ferguson pertains to the use of a printed circuit substrate for interconnecting solar cells. As is well known, a printed circuit substrate is the antithesis of separate pieces of interconnects leads. In a printed circuit substrate, interconnections between devices mounted on the substrate are made using trace lines integrated with the substrate. For example, in Ferguson, solar cells 12 are interconnected using bus lines 14, network path 13, and traces 20 of the printed circuit substrate 10. It is respectfully submitted that one

of ordinary skill will not consider these lines of the printed circuit substrate 10 as separate pieces, let alone interconnect leads, as they are not discrete pieces but rather integrated with the printed circuit substrate.

To expedite prosecution, claim 1 and following independent claims noted below have been amended to emphasize that the pieces are discrete. Note, however, that discreteness of individual pieces is inherent in these claims as originally presented for examination.

Therefore, it is respectfully submitted that claim 1 is patentable over Ferguson.

Claims 2, 3, 7, and 10 depend on claim 1 and are thus patentable over Ferguson at least for the same reasons that claim 1 is patentable.

Similar to claim 1, claim 11 is patentable over Ferguson at least for reciting: “electrically coupled by individual discrete pieces of interconnect leads to corresponding contact points on a second backside-contact solar cell.”

Claim 12 depends on claim 11 and is thus patentable over Ferguson at least for the same reasons that claim 11 is patentable.

Similar to claim 1, claim 17 is patentable over Ferguson at least for reciting: “using a first discrete interconnect lead” and “using a second discrete interconnect lead.”

Claim 18 depends on claim 17 and is thus patentable over Ferguson at least for the same reasons that claim 17 is patentable.

Similar to claim 1, claim 20 is patentable over Ferguson at least for reciting: “a plurality of discrete connection means for electrically coupling the first backside-contact solar cell to the second backside-contact solar cell.”

Claim 22 depends on claim 20 and is thus patentable over Ferguson at least for the same reasons that claim 20 is patentable.

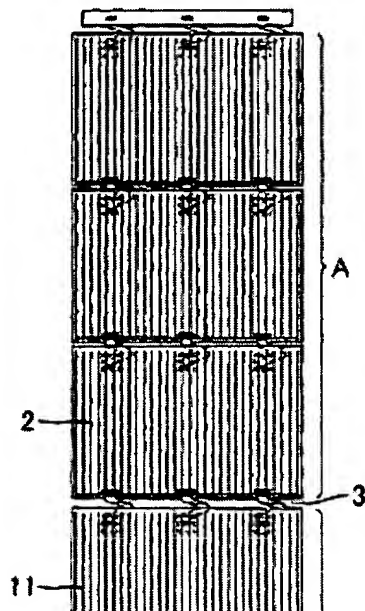
Claim Rejection -- 35 U.S.C. § 103 (Shimada and Gee)

Claims 1, 2, 6-11, 16, 17, 20, and 21 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Publication No. 2002/00599952 by Shimada in view of U.S. Patent No. 5,468,652 to Gee ("Gee"). The rejection is respectfully traversed.

There are three requirements to establish a prima facie case of obviousness. First, there must be some suggestion or motivation to modify a reference or to combine references. Second, there must be a reasonable expectation of success. Third, the prior art reference or combined references must teach or suggest all the claim limitations. See MPEP § 2143.

Shimada discloses interconnection of solar cell modules where a solar cell is connected to an adjacent solar cell by interconnectors 9 from an edge of a top surface of one cell to an edge of a bottom surface of another cell. A portion of Shimada FIG. 4, cited in the last office action, is shown below for ease of discussion.

FIG. 4



Shimada's interconnect structure involves the use of leads going from one side surface of the solar cell to an opposing side surface of an adjacent solar cell. Shimada must employ more than one strip to connect solar cells for structural integrity. Because

each side of the solar cell has a different polarity in Shimada, a plurality of interconnectors 9 can link one cell to another. As noted in the last office action, Shimada does not disclose back contacted solar cells.

The last office action suggests that Gee discloses back contacted solar cells and it would have been obvious to interconnect Gee's solar cells using Shimada's interconnectors. Applicants respectfully disagree with this conclusion. Gee FIG. 1, cited in the last office action, is reproduced below for ease of discussion.

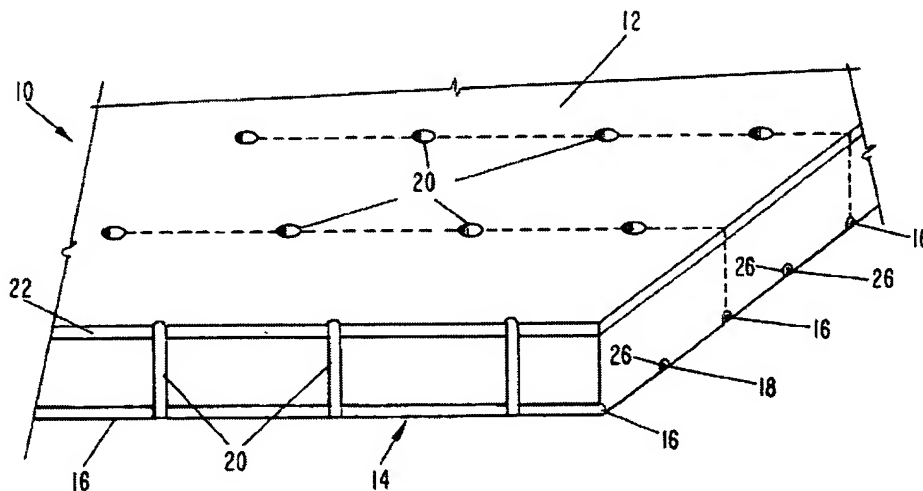


FIG-1

It is respectfully submitted that although Gee discloses a process for making a solar cell 10, Gee does not disclose contact pads for the solar cell. That is, Gee does not disclose enough information to show how the solar cell 10 would be interconnected with other solar cells. Gee FIGS. 1 and 2 only show cross-sections of the solar cell 10. Therefore, one of ordinary skill in the art would have no information how interconnect Gee using Shimada's interconnect structure.

As a particular example, in Gee, contacts 18 are P-type contacts while grooves 16 are N-type contacts (Gee, col. 3, lines 10-29). Shimada, on the other hand, requires solar cells having opposing polarities on opposite ends to be able to string the solar cells with interconnectors 9 in a positive-to-negative (or vice versa) fashion. Taking Gee FIG. 1 at its face value, Shimada's interconnectors 9 would thus need to connect contacts 18 from one cell to a groove 16 of another cell. This creates at least two problems. One, the

number of interconnectors 9 per polarity on each side would be decreased by half to accommodate both polarities on the same side. This decreases the current carrying capacity and redundancy per polarity. Furthermore, Shimada does not disclose enough interconnectors 9 per side to accommodate Gee's solar cell. Second, the position of contact 18 and grooves 16 would have to be different per cell to allow for an inline connection using interconnectors 9; otherwise, a terminal of a particular polarity from one cell would be connected to another terminal of the same polarity in another cell. This unnecessarily complicates the fabrication and installation of the solar cells.

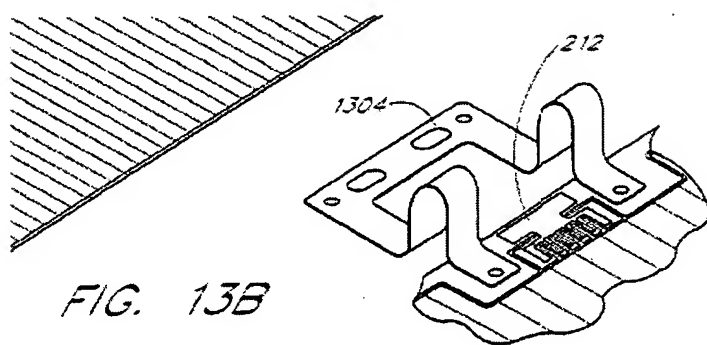
It is to be noted that while Gee's solar cell 10 may be compatible with Ferguson's printed circuit substrate 10, the printed circuit substrate 10 does not employ discrete interconnect leads as explained above in connection with claim 1.

Therefore it is respectfully submitted that claims 1, 2, 6-11, 16, 17, 20, and 21 are patentable over the combination of Shimada and Gee.

Claim Rejection -- 35 U.S.C. § 103 (Shimada, Gee, and Ho)

Claims 3, 5, 12, 15, 18, and 22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Shimada in view of Gee as applied to claims 1, 2, 6-11, 16, 17, 20, and 21 and further in view of U.S. Publication No. 2004/0040593 by Ho et al. ("Ho"). The rejection is respectfully traversed.

Claim 3, 12, 18, and 22 require interconnect leads having a curve for strain relief. As noted in the last office action, neither Shimada nor Gee discloses such pieces of interconnect leads. Ho FIG. 13B, cited in the last office action, is reproduced below for ease of discussion.



In Ho, each tab 1304 has two joined, rather than separate pieces, of in-line interconnect leads. It is respectfully submitted that one of ordinary skill in the art would not be motivated to use Ho's tab 1304 in Shimada's interconnect structure for at least two reasons. One, Shimada interconnectors 9 comprise single strips with a zigzag shape. Such a zigzag shape cannot be bent in the manner of Ho's joined interconnect leads without unnecessarily lengthening interconnectors 9, leading to losses. Second, bending an interconnector 9 would serve no purpose as an interconnector 9 already has strain relief along its edges due to the zigzag shape.

Therefore, it is respectfully submitted that claims 3, 12, 18, and 22 are patentable over the combination of Shimada, Gee, and Ho.

Claims 5 and 15 require each piece of interconnect lead to be perforated. It is respectfully submitted that although tab 1304 of Ho has slots, the joined leads themselves are solid and have no perforations. Therefore, it is respectfully submitted that claims 5 and 15 are patentable over the combination of Shimada, Gee, and Ho.

Claims 5 and 15 have been amended to clarify the perforations of the interconnect leads.

Other Claims

Other claims of the application stand rejected under various combinations that use Ferguson or the combination of Shimada and Gee as primary references. These other claims are patentable at least for depending on patentable base claims.

Conclusion

For at least the above reasons, it is believed that claims 1-22 are in condition for allowance. The Examiner is invited to telephone the undersigned at (408)436-2112 for any questions.

If for any reason an insufficient fee has been paid, the Commissioner is hereby authorized to charge the insufficiency to Deposit Account No. 50-2427.

Respectfully submitted,
Shandor G. Daroczi et al.

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Patrick D. Benedicto

Patrick D. Benedicto, Reg. No. 40,909
Okamoto & Benedicto LLP
P.O. Box 641330
San Jose, CA 95164
Tel.: (408)436-2110
Fax.: (408)436-2114

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